

# Migration to TOSS Operating System

The default production environment for most NAS systems is Red Hat Enterprise Linux-based Tri-Lab Operating System Stack (TOSS), developed at the U.S. Department of Energy.

With some exceptions (listed below), most systems were transitioned from SUSE Linux Enterprise Server (SLES) to TOSS in January, 2022. This transition enables better alignment with open source development activities, helps streamline and reduce ongoing costs, and facilitates interagency collaborative efforts in systems and application software.

The default operating environment for the Pleiades front ends (PFEs), all Intel Xeon compute CPU nodes and all CPU+GPU nodes on Pleiades, Electra, and Aitken is `:aoe=toss3`, and the PFE load balancer connects to PFEs running TOSS 3. As of early Sept 2022, the default operating environment for the Aitken Rome compute nodes is `:aoe=toss4`.

Note: The alternate operating environments `:aoe=sles12` and `:aoe=sles15` are no longer available on any of the compute nodes. In addition, on Aitken's Rome nodes, `:aoe=toss3` is also not available.

This article provides some basic information to help you run applications on the TOSS operating system.

## Pleiades Front Ends (PFEs) and the PFE Load Balancer

Using the [Pleiades Front End Load Balancer](#) will select pfe[20-27], which are running TOSS 3. For example:

```
your_local_host% ssh pfe
pfe27%
```

To find out the operating system of the PFE you are on, do:

```
pfe% grep . /etc/os-release
```

## Compute Nodes

All cluster systems, including all CPU and CPU+GPU model types in Pleiades, Electra, and the Aitken Cascade Lake nodes will run the TOSS 3 image by default. The Aitken Rome nodes will run the TOSS 4 image by default.

The following systems will continue to run with SLES 12 until further notice:

- The Lou front-end nodes, lfe[5-8].
- The Lou Data Analysis (LDAN) nodes.
- The shared memory systems Endeavour3 and Endeavour4.

## Running PBS Jobs

All jobs submitted to run on Pleiades, Electra, and on the Aitken Cascade Lake nodes use `:aoe=toss3` by default. All jobs submitted to run on the Aitken Rome nodes use `:aoe=toss4` by default.

PBS no longer schedules jobs requesting the previously available alternate operating environments `:aoe=sles12` or `:aoe=sles15`.

## Using Software Modules

On the PFEs and compute nodes booted with a TOSS 3 image, the default MODULEPATH includes the following:

```
/usr/share/modules/modulefiles  
/nasa/modulefiles/toss3  
/nasa/modulefiles/spack/gcc-4.8/  
/nasa/modulefiles/pkgsrc/toss3/
```

On the Aitken Rome nodes booted with a TOSS 4 image, the default MODULEPATH includes:

```
/usr/share/Modules/modulefiles  
/nasa/modulefiles/toss4  
/nasa/modulefiles/spack  
/nasa/modulefiles/pkgsrc/toss4
```

Use the `module avail` command to find what software modules are added under these paths.

## Building and Running Your Application

Many executables built under SLES 12 will also run under TOSS 3. Similarly, executables built under TOSS 3 may also run under TOSS 4. Please check for both correctness and performance.

Note: For the `rom_ait` model type, the HPE MPT library 2.25 (`mpi-hpe/mpt.2.25` from the `/nasa/modulefiles/toss4` directory) is required for running MPI applications under TOSS. Earlier MPT versions will not work.

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